

REMARKS

Applicants thank the Examiner for the thorough examination given the present application.

Status of the Claims

Claims 1-21 and 32-35 will be pending in the above-identified application upon entry of the present amendment. Claim 33 has been amended to depend from claim 1. Non-elected claims 22-31 have been canceled herein. Thus, no new matter has been added. Based upon the above considerations, entry of the present amendment is respectfully requested.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

Issues under 35 U.S.C. § 102(b)

Claim 32 is rejected under 35 U.S.C. § 102(b) as being anticipated by Minakata et al. '599 (WO 2003/016599 A1). Applicants respectfully traverse. Reconsideration and withdrawal of this rejection are respectfully requested based on the following considerations.

Legal Standard for Determining Anticipation

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegual Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is

known in the prior art.” *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001). “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Distinctions over the Cited Reference

Claim 32 is related to a hydroxypolyacene derivative and is especially related to a matter of having a chemical structure for corresponding to the polyacene compound as shown in the chemical formula (IV). That is, a chemical structure which comprises the same number of six-membered rings and the same groups R₁, R₂, R₃, and R₄ held in the polyacene compound of the chemical formula (IV) and at least one of the carbon atoms other than the ones bound to the groups R₁, R₂, R₃, and R₄ of the polyacene compound is bound to the hydroxyl group and the hydrogen atom.

In contrast, the polyacene compound of Minakata et al. '599, such as 2,3,9,10-tetramethylpentacene and others, is described. The chemical compound described in Minakata et al. '599 is a polyacene compound. Since it is not a hydroxypolyacene derivative, the chemical structure recited in claim 32 is completely different from the chemical structure of the chemical compound described in Minakata et al. '599.

As described above, the chemical structure of the hydroxypolyacene derivative according to claim 32 is completely different from the chemical structure of the chemical compound described in Minakata et al. '599. Accordingly, the present invention is not anticipated by

Minakata et al. '599 since the reference does not teach or provide for each of the limitations recited in the pending claims.

Issues under 35 U.S.C. § 103(a)

1) Claims 1-21 and 34-35 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Minakata '010 (US 7,061,010 B2).

2) Claim 33 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Sparfel et al. (Tetrahedron, 1980, 36(15), pages 2225-35).

Applicants respectfully traverse. Reconsideration and withdrawal of these rejections are respectfully requested based on the following considerations.

Legal Standard for Determining Prima Facie Obviousness

MPEP 2141 sets forth the guidelines in determining obviousness. First, the Examiner has to take into account the factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), which has provided the controlling framework for an obviousness analysis. The four *Graham* factors are:

- (a) determining the scope and content of the prior art;
- (b) ascertaining the differences between the prior art and the claims in issue;
- (c) resolving the level of ordinary skill in the pertinent art; and
- (d) evaluating any evidence of secondary considerations.

Graham v. John Deere, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

Second, the Examiner has to provide some rationale for determining obviousness. MPEP 2143 sets forth some rationales that were established in the recent decision of *KSR International*

Co. v Teleflex Inc., 82 USPQ2d 1385 (U.S. 2007). Exemplary rationales that may support a conclusion of obviousness include:

- (a) combining prior art elements according to known methods to yield predictable results;
- (b) simple substitution of one known element for another to obtain predictable results;
- (c) use of known technique to improve similar devices (methods, or products) in the same way;
- (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- (e) “obvious to try” – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success
- (f) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

As the MPEP directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. See MPEP 2143.03.

Distinctions over Minakata '010

Applicants respectfully submit that Minakata '010 fails to disclose each and every element of independent claims 1 and 10 as well as those claims dependent thereon. The present invention recites a polyacene compound having great solubility and oxidation resistance. Solubility is improved for a polyacene compound having low solubility by introducing functional groups, such as alkyl groups and others, in the positions of R₁, R₂, R₃, and R₄ (the displacement

position in the major axis direction of the polyacene compound molecule). Oxidation resistance is improved for a polyacene compound having low oxidation resistance by introducing 2 or more halogen groups in the position of X (the displacement position in the minor axis direction of the polyacene compound molecule). That is, on a polyacene compound having no functional groups, the solubility of the polyacene compound is improved by introducing functional groups such as alkyl groups and others, and the oxidation resistance of the polyacene compound is improved by introducing halogen groups.

As described in the present specification, oxidation resistance is improved by introducing halogen groups to the polyacene compound because the ionizing potential of the molecule is increased by introducing the halogen groups. As such, the reactivity to the oxidizing agent, such as oxygen and others, is decreased. Enclosed herewith is experimental data that indicates the dramatic improvement in the oxidation resistance of the polyacene compound by introducing halogen groups.

In Minakata '010, a polyacene compound having a functional group, such as an alkyl group and others, and a polyacene compound having a fluorine atom are described. However, a polyacene compound having both a functional group, such as alkyl group and others, and a halogen group is not described in Minakata '010. Minakata '010 also fails to disclose improving oxidation resistance by introducing a halogen group.

As stated above, the polyacene compound according to the present invention and the polyacene compound described in Minakata '010 are completely different in their chemical structures and effects. That is, since the polyacene compound of the present invention has both the functional group, such as an alkyl group and others, and the halogen group, the solubility and oxidation resistance of the polyacene compound of the present invention are remarkably

improved from the polyacene compound described in Minakata '010 when both of them are compared. Further, Minakata '010 fails to disclose any reason or rationale for introducing both the functional group, such as an alkyl group and others, and the halogen group to a polyacene compound in order to improve both the solubility and oxidation resistance.

To establish a *prima facie* case of obviousness of a claimed invention, all of the claim limitations must be disclosed by the cited reference. As discussed above, Minakata '010 fails to disclose all of the claim limitations of independent claims 1 and 10, and those claims dependent thereon. Accordingly, the reference does not render the present invention obvious.

Furthermore, the cited reference or the knowledge in the art provides no reason or rationale that would allow one of ordinary skill in the art to arrive at the present invention as claimed. Therefore, a *prima facie* case of obviousness has not been established, and withdrawal of the outstanding rejection is respectfully requested. Any contentions of the USPTO to the contrary must be reconsidered at present.

Distinctions over Sparfel et al.

Claim 33 claims a hydroxypolyacene derivative, which is a precursor for synthesizing a polyacene compound, having a chemical structure represented by the chemical formula (III), wherein functional groups, such as an alkyl group and others, in the positions of R₁, R₂, R₃, and R₄ (the displacement position in the major axis direction of the polyacene compound molecule) and a halogen group in the position of X (the displacement position in the minor axis direction of the polyacene compound molecule) are specified.

Since the polyacene compound synthesized from this hydroxypolyacene derivative has both the functional groups, such as an alkyl group and others, and the halogen group in the

substituting positions, this polyacene compound has a great solubility due to the functional groups and a great oxidation resistance due to the halogen group. As such, the hydroxypolyacene derivative according to claim 33 is a precursor for synthesizing a polyacene compound which has great solubility and oxidation resistance.

In contrast, Sparfel et al. disclose 6,13-pentacenediol. Sparfel et al. fail to disclose a pentacenediol having both functional groups, such as an alkyl group and others, and a halogen group. The Examiner asserts that "it is common practice in the art to replace hydrogen on the aromatic ring by aliphatic alkyl groups or halogens or amines etc." However, Sparfel et al. fail to disclose introducing any functional groups or their effects of providing great solubility and oxidation resistance to the polyacene compound. One of ordinary skill in the art would have no reason or rationale for introducing the functional groups, such as an alkyl group and others, and the halogen groups to the substituting positions of the hydroxypolyacene derivative, which is the precursor of the polyacene compound.

To establish a *prima facie* case of obviousness of a claimed invention, all of the claim limitations must be disclosed by the cited reference. As discussed above, Sparfel et al. fail to disclose all of the claim limitations of claim 33. Accordingly, the reference does not render the present invention obvious.

Furthermore, the cited reference or the knowledge in the art provides no reason or rationale that would allow one of ordinary skill in the art to arrive at the present invention as claimed. Therefore, a *prima facie* case of obviousness has not been established, and withdrawal of the outstanding rejection is respectfully requested. Any contentions of the USPTO to the contrary must be reconsidered at present.

Conclusion

Based upon the amendments and remarks presented herein, the Examiner is respectfully requested to issue a Notice of Allowance clearly indicating that each of the pending claims 1-21 and 32-35 is allowable under the provisions of Title 35 of the United States Code.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey, Reg. No. 32,881, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

Dated: April 22, 2010

Respectfully submitted,

By

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Attachment: Additional Experimental Result (8 pages)